WHAT IS CLAIMED IS:

1. An electromagnetic fuel injector, in which a hollow fixed core, an electromagnetic coil and a yoke are arranged from the center toward the outer diameter, a needle with a valve element is contained in a nozzle body fixed to the lower portion of the yoke, and the needle is urged toward a valve seat by the force of a return spring, the electromagnetic fuel injector characterized in that:

a fuel swirler positioned upstream of an injection orifice is disposed at the tip of the nozzle body, the fixed core and the nozzle body being coupled to each other via a non-magnetic cylindrical seal ring press-fitted and welded to the outer circumference of one end on the nozzle body side of the fixed core and the inner circumference of one end of the nozzle body; and

the inner circumference of the fuel swirler and the inner circumference of the seal ring function as a guide for slidably guiding a stroke movement of the needle.

2. An electromagnetic fuel injector according to claim 1, characterized in that the yoke and the nozzle body also are coupled to each other by press-fitting and welding.

3. An electromagnetic fuel injector according to claim 2, characterized in that the seal ring has a flange at one end thereof, one end of a cylindrical portion on a side opposite to the flange is press-fitted and welded to

B2 one end of the outer circumference of the fixed core, while the flange is press-fitted and welded to an annular step formed at the upper end of the nozzle body; and

the yoke and the nozzle body are press-fitted in a spigot joint manner, followed by welding.

4. An electromagnetic fuel injector, in which an electromagnetic coil and a yoke are arranged around a hollow, cylindrical fixed core, a nozzle body containing therein a needle with a valve element is fixed to the lower portion of the yoke, and the needle is urged toward a valve seat by the force of a return spring, the electromagnetic fuel injector characterized in that:

the electromagnetic coil and the yoke are configured in such a manner as to be fitted around the fixed core from above the fixed core;

the yoke can be coupled to the upper end of the nozzle body in such a manner as to cover the electromagnetic core;

a terminal taking-out window for the electromagnetic coil is formed at a part of the upper portion of the yoke; and

the inner surface of the upper end of the yoke presses the electromagnetic coil, thus fixing the coil.

5. An electromagnetic fuel injector according to claim 4, characterized in that a bore of the upper end of

B2 the yoke is drawn, and the inner circumference of the upper end is coupled to the outer circumference of the fixed core by any of welding, press-fitting and caulking.

6. An electromagnetic fuel injector, in which an electromagnetic coil and a yoke are arranged around a fixed core, a nozzle body containing therein a needle with a valve element is fixed to the lower portion of the yoke, and the needle is urged toward a valve seat by the force of a return spring, the electromagnetic fuel injector characterized in that:

the fixed core and the nozzle body are coupled to each other via a non-magnetic cylindrical seal ring extending over the outer circumference of one end of the fixed core and the inner circumference of one end of the nozzle body;

the inner circumference of the seal ring serves as a guide for the needle;

the needle has a hollow, cylindrical movable core, the outer circumference of the upper portion of the movable core being slidably guided on the inner circumference of the seal ring during a stroke movement, a fuel passage being secured between the outer circumference of the lower portion and the inner circumference of the nozzle body, and the fuel passage communicating with another fuel passage defined inside of the movable core via a through hole

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formed at the movable core.

7. An electromagnetic fuel injector according to claim 6, characterized in that the outer circumference of the lower portion of the movable core is made to be smaller in diameter than the outer circumference of the upper portion thereof so as to enlarge the fuel passage defined between the outer circumference of the lower portion and the inner circumference of the nozzle body, the through hole being formed on a core wall on which the outer circumference of the lower portion is positioned.

8. An electromagnetic fuel injector characterized in that:

a nozzle body, an orifice plate having an injection orifice and a fuel swirler are formed of separate members;

an inner circumference having a receiving surface for disposing the fuel swirler and the orifice plate is formed at one end on a fuel injection side of the nozzle body;

the fuel swirler is loosely fitted to the inner circumference of the nozzle body in such a manner as to be received at the receiving surface of the nozzle body; and

the orifice plate is press-fitted and welded to the inner circumference in such a manner as to press the fuel swirler.

9. An electromagnetic fuel injector characterized in

that:

a nozzle body, an orifice plate having an injection orifice and a fuel swirler are formed of separate members;

an inner circumference having a receiving surface for disposing the fuel swirler and the orifice plate is formed at one end on a fuel injection side of the nozzle body; and

the fuel swirler is held between the receiving surface of the nozzle body and the orifice plate, thus defining an annular fuel passage between the outer circumference of the fuel swirler and the inner circumference of the nozzle body, so that fuel flows into a passage groove formed at the lower end surface of the fuel swirler via the annular fuel passage.

10. An electromagnetic fuel injector according to claim 8 or claim 9, characterized in that a guide groove for guiding the fuel to the outer circumference of the fuel swirler is formed between the upper end surface of the fuel swirler and the receiving surface of the nozzle body for receiving the upper end surface of the fuel swirler.

11. An electromagnetic fuel injector according to claim 10, characterized in that the guide groove is formed at the upper end surface of the fuel swirler and/or the receiving surface of the nozzle body.

12. An electromagnetic fuel injector according to

claims 8 , characterized in that the hardness of the fuel swirler is greater than that of the orifice plate.

13. An electromagnetic fuel injector according to claims 8, characterized in that a part of the orifice plate intrudes into the passage groove for generating a swirl, formed at the lower end surface of the fuel swirler.

14. An electromagnetic fuel injector in which a fuel swirler is disposed upstream of a fuel injection orifice, the electromagnetic fuel injector characterized in that:

a passage groove for generating a swirl and an annular passage communicating with the passage groove on an upstream side are formed at the lower end surface of the fuel swirler.

15. An electromagnetic fuel injector according to claim 14, characterized in that the annular passage is defined by forming an annular step at the peripheral edge of one end surface of the fuel swirler.

16. An electromagnetic fuel injector, in which a hollow fixed core, an electromagnetic coil and a yoke are arranged from the center toward the outer diameter, a needle with a valve element is contained in a nozzle body fixed to the lower portion of the yoke, and the needle is urged toward a valve seat with application of the force of a return spring, the electromagnetic fuel injector characterized in that:

B4 a mass movable in an axial direction independently of the needle is interposed between the return spring and the needle.

17. An electromagnetic fuel injector, in which a hollow fixed core, an electromagnetic coil and a yoke are arranged from the center toward the outer diameter, a needle having a valve element is contained in a nozzle body fixed to the lower portion of the yoke, and the needle is urged toward a valve seat by the force of a return spring, the electromagnetic fuel injector characterized in that:

a mass movable in an axial direction independently of the needle is interposed between the return spring and the needle, and a plate spring is interposed between the mass and the needle.

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